

contributions to include amounts paid to an employee organization as union dues. Union dues are generally considered to be income to the union and, like other assets of the union, may be subject to the claims of the union's general creditors or used for the organization's general purposes. The Department has concluded that amounts paid as union dues should not be characterized as participant contributions merely because a portion of such dues might be used to provide benefits under a welfare or pension plan sponsored by the employee organization.⁷

(4) Effective Date

The Department is establishing an effective date for this final rule of 90 days from the date of its publication in the *Federal Register* in order to allow employers to adjust their accounting procedures and payroll systems to comply with the new rule. During this 90 day period, as noted above, all affected employers should examine their current payroll practices to determine whether they are in compliance with today's rule, that is, whether they are transmitting participant contribution amounts to the plan at the earliest date such contributions can reasonably be segregated from the employer's assets, not to exceed 90 days from the date of payment to or withholding by the employer.

(5) Designation

This final rule is being published at 29 CFR 2510.3-102.

Regulatory Flexibility Act

The Department has determined that this regulation would not have a significant economic impact on small plans or other small entities. The regulation would describe when contributions made by a participant of a plan subject to ERISA or to the related prohibited transaction excise tax provisions of the Internal Revenue Code must be transmitted to the plan by an employer withholding the contributions.

Executive Order 12291

The Department has determined that the regulatory action would not constitute a "major rule" as that term is used in Executive Order 12291 because the action would not result in: an annual effect on the economy of \$100 million; a major increase in costs or prices for consumers, individual industries, government agencies, or geographical regions; or significant adverse effects on

competition, employment, investment productivity, innovation, or the ability of United States based enterprises to compete with foreign based enterprises in domestic or export markets.

Paperwork Reduction Act

The regulation being issued here is not subject to the requirements of the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 *et seq.*) because it does not contain an "information collection request" as defined in 44 U.S.C. 3502(11).

Statutory Authority

The final regulation is being adopted pursuant to the authority contained in section 505 of ERISA (Pub. L. 93-406, 88 Stat. 894; 29 U.S.C. 1135) and section 102 of Reorganization Plan No. 4 of 1978 (43 FR 47713, October 17, 1978), effective December 31, 1978 (44 FR 1065, January 3, 1979), 3 CFR 1978 Comp. 332, and under Secretary of Labor's Order No. 1-87.

List of Subjects in 29 CFR Part 2510

Employee benefit plans, Employee Retirement Income Security Act, Pensions, Plan assets.

Final Rule

The Department is amending Part 2510 of Chapter XXV of Title 29 of the Code of Federal Regulations as follows:

PART 2510—[AMENDED]

1. The authority citation for Part 2510 is revised to read as set forth below:

Authority: Secs. 3(2), 111(c), 505, Pub. L. 93-406, 88 Stat. 852, 894, (29 U.S.C. 1002(2), 1031, 1135); Secretary of Labor's Order No. 27-74, 1-86, 1-87, and Labor Management Services Administration Order No. 2-6.

Section 2510.3-101 is also issued under sec. 102 of Reorganization Plan No. 4 of 1978 (43 FR 47713, October 17, 1978), effective December 31, 1978 (44 FR 1065, January 3, 1979); 3 CFR 1978 Comp. 332, and sec. 11018(d) of Pub. L. 99-272, 100 Stat. 82.

Section 2510.3-102 is also issued under sec. 102 of Reorganization Plan No. 4 of 1978 (43 FR 47713, October 17, 1978), effective December 31, 1978 (44 FR 1065, January 3, 1979), and 3 CFR 1978 Comp. 332.

2. By adding, in the appropriate place, the following § 2510.3-102:

§ 2510.3-102. Definition of "plan assets"—participant contributions.

(a) *Participant contributions.* For purposes of Subtitle A and Parts 1 and 4 of Subtitle B of Title I of ERISA and section 4975 of the Internal Revenue Code only (but without any implication for and may not be relied upon to bar criminal prosecutions under 18 U.S.C. 664), the assets of the plan include amounts (other than union dues) that a participant or beneficiary pays to an employer, or amounts that a participant has withheld from his wages by an

employer, for contribution to the plan as of the earliest date on which such contributions can reasonably be segregated from the employer's general assets, not to exceed 90 days from the date on which such amounts are received by the employer (in the case of amounts that a participant or beneficiary pays to an employer) or the date on which such amounts would otherwise have been payable to the participant in cash (in the case of amounts withheld by an employer from a participant's wages).

(b) *Examples.* The requirements of this section are illustrated by the following examples:

(1) Employer W is a large national corporation that has several payroll centers. Since each payroll center has a different pay period and each center maintains separate accounts on its books for purposes of accounting for that center's payroll deductions, the company has adopted a procedure under which each payroll center promptly forwards figures representing its total payroll deductions for each plan for such month to a centralized location where amounts from all centers are promptly totaled and a single check representing the aggregate participant contributions for the month is issued promptly to the plan by the employer. W has reasonably concluded that this procedure permits segregation of participant contributions at the earliest practicable time. Under paragraph (a), the assets of the plan include the participant contributions as of the date on which the employer issues the check to the plan.

(2) Employer X is a small company with a small number of employees at a single payroll location. X maintains a contributory profit-sharing plan in which all of its employees participate. X's practice is to commingle accumulated participant contributions with its general assets and to issue a single check to the trust that is maintained under the plan in the amount of such accumulated contributions once each quarter. In view of the relatively small number of employees and the fact that they are paid from a single location, X could reasonably be expected to transmit participant contributions to a trust within 10 days of the close of each pay period. The assets of the plan include the participant contributions attributable to any pay period as of the date 10 days from the close of such period.

(c) *Effective date.* This section is effective August 15, 1988.

Signed at Washington, DC, this 11th day of May 1988.

David M. Walker,
Assistant Secretary, Pension and Welfare
Benefits Administration, U.S. Department of
Labor.

[FR Doc. 88-10935 Filed 5-16-88; 8:45 am]

BILLING CODE 4510-29-M

⁷ In some circumstances a union may so specifically " earmark " a portion of such dues as a source of benefits under a plan that those monies should be considered plan assets. This issue is beyond the scope of the regulation being published here.

Federal Register

Tuesday
May 17, 1988

Part VI

Department of Labor

Pension and Welfare Benefits Administration

29 CFR Part 2510

Regulation Relating to the Definition of Adequate Consideration; Notice of Proposed Rulemaking

DEPARTMENT OF LABOR**Pension and Welfare Benefits Administration****29 CFR Part 2510****Proposed Regulation Relating to the Definition of Adequate Consideration**

AGENCY: Pension and Welfare Benefits Administration, Department of Labor.

ACTION: Notice of proposed rulemaking.

SUMMARY: This document contains a notice of a proposed regulation under the Employee Retirement Income Security Act of 1974 (the Act or ERISA) and the Federal Employees' Retirement System Act of 1986 (FERSA). The proposal clarifies the definition of the term "adequate consideration" provided in section 3(18)(B) of the Act and section 8477(a)(2)(B) of FERSA for assets other than securities for which there is a generally recognized market. Section 3(18)(B) and section 8477(a)(2)(B) provide that the term "adequate consideration" for such assets means the fair market value of the asset as determined in good faith by the trustee or named fiduciary (or, in the case of FERSA, a fiduciary) pursuant to the terms of the plan and in accordance with regulations promulgated by the Secretary of Labor. Because valuation questions of this nature arise in a variety of contexts, the Department is proposing this regulation in order to provide the certainty necessary for plan fiduciaries to fulfill their statutory duties. If adopted, the regulation would affect plans investing in assets other than securities for which there is a generally recognized market.

DATES: Written comments on the proposed regulation must be received by July 18, 1988. If adopted, the regulation will be effective for transactions taking place after the date 30 days following publication of the regulation in final form.

ADDRESS: Written comments on the proposed regulation (preferably three copies) should be submitted to: Office of Regulations and Interpretations, Pension and Welfare Benefits Administration, Room N-5671, U.S. Department of Labor, 200 Constitution Avenue NW., Washington, DC 20216, Attention: Adequate Consideration Proposal. All written comments will be available for public inspection at the Public Disclosure Room, Pension and Welfare Benefits Administration, U.S. Department of Labor, Room N-5507, 200 Constitution Avenue NW., Washington, DC.

FOR FURTHER INFORMATION CONTACT: Daniel J. Maguire, Esq., Plan Benefits Security Division, Office of the Solicitor, U.S. Department of Labor, Washington, DC 20210, (202) 523-9596 (not a toll-free number) or Mark A. Greenstein, Office of Regulations and Interpretations, Pension and Welfare Benefits Administration, (202) 523-7901 (not a toll-free number).

SUPPLEMENTARY INFORMATION:**A. Background**

Notice is hereby given of a proposed regulation under section 3(18)(B) of the Act and section 8477(a)(2)(B) of FERSA. Section 3(18) of the Act provides the definition for the term "adequate consideration," and states:

The term "adequate consideration" when used in part 4 of subtitle B means (A) in the case of a security for which there is a generally recognized market, either (i) the price of the security prevailing on a national securities exchange which is registered under section 6 of the Securities Exchange Act of 1934, or (ii) if the security is not traded on such a national securities exchange, a price not less favorable to the plan than the offering price for the security as established by the current bid and asked prices quoted by persons independent of the issuer and of any party in interest; and (B) in the case of an asset other than a security for which there is a generally recognized market, the fair market value of the asset as determined in good faith by the trustee or named fiduciary pursuant to the terms of the plan and in accordance with regulations promulgated by the Secretary.

The term "adequate consideration" appears four times in part 4 of subtitle B of Title I of the Act, and each time represents a central requirement for a statutory exemption from the prohibited transaction restrictions of the Act. Under section 408(b)(5), a plan may purchase insurance contracts from certain parties in interest if, among other conditions, the plan pays no more than adequate consideration. Section 408(b)(7) provides that the prohibited transaction provisions of section 406 shall not apply to the exercise of a privilege to convert securities, to the extent provided in regulations of the Secretary of Labor, only if the plan receives no less than adequate consideration pursuant to such conversion. Section 408(e) of the Act provides that the prohibitions in sections 406 and 407(a) of the Act shall not apply to the acquisition or sale by a plan of qualifying employer securities, or the acquisition, sale or lease by a plan of qualifying employer real property if, among other conditions, the acquisition, sale or lease is for adequate consideration. Section 414(c)(5) of the Act states that sections 406 and 407(a)

of the Act shall not apply to the sale, exchange, or other disposition of property which is owned by a plan on June 30, 1974, and all times thereafter, to a party in interest, if such plan is required to dispose of the property in order to comply with the provisions of section 407(a) (relating to the prohibition against holding excess employer securities and employer real property), and if the plan receives not less than adequate consideration.

Public utilization of these statutory exemptions requires a determination of "adequate consideration" in accordance with the definition contained in section 3(18) of the Act. Guidance is especially important in this area because many of the transactions covered by these statutory exemptions involve plan dealings with the plan sponsor. A fiduciary's determination of the adequacy of consideration paid under such circumstances represents a major safeguard for plans against the potential for abuse inherent in such transactions.

The Federal Employees' Retirement System Act of 1986 (FERSA) established the Federal Retirement Thrift Investment Board whose members act as fiduciaries with regard to the assets of the Thrift Savings Fund. In general, FERSA contains fiduciary obligation and prohibited transaction provisions similar to ERISA. However, unlike ERISA, FERSA prohibits party in interest transactions similar to those described in section 406(a) of ERISA only in those circumstances where adequate consideration is not exchanged between the Fund and the party in interest. Specifically, section 8477(c)(1) of FERSA provides that, except in exchange for adequate consideration, a fiduciary shall not permit the Thrift Savings Fund to engage in: transfers of its assets to, acquisition of property from or sales of property to, or transfers or exchanges of services with any person the fiduciary knows or should know to be a party in interest. Section 8477(a)(2) provides the FERSA definition for the term "adequate consideration" which is virtually identical to that contained in section 3(18) of ERISA. Thus, the proposal would apply to both section 3(18) of ERISA and section 8477(a)(2) of FERSA.

When the asset being valued is a security for which there is a generally recognized market, the plan fiduciary must determine "adequate consideration" by reference to the provisions of section 3(18)(A) of the Act (or with regard to FERSA, section 8477(a)(2)(A)). Section 3(18)(A) and section 8477(a)(2)(A) provide detailed reference points for the valuation of

securities within its coverage, and in effect provides that adequate consideration for such securities is the prevailing market price. It is not the Department's intention to analyze the requirements of section 3(18)(A) or 8477(a)(2)(A) in this proposal. Fiduciaries must, however, determine whether a security is subject to the specific provisions of section 3(18)(A) (or section 8477(a)(2)(A) of FERSA) or the more general requirements of section 3(18)(B) (or section 8477(a)(2)(B)) as interpreted in this proposal. The question of whether a security is one for which there is a generally recognized market requires a factual determination in light of the character of the security and the nature and extent of market activity with regard to the security. Generally, the Department will examine whether a security is being actively traded so as to provide the benchmarks Congress intended. Isolated trading activity, or trades between related parties, generally will not be sufficient to show the existence of a generally recognized market for the purposes of section 3(18)(A) or section 8477(a)(2)(A).

In the case of all assets other than securities for which there is a generally recognized market, fiduciaries must determine adequate consideration pursuant to section 3(18)(B) of the Act (or, in the case of FERSA, section 8477(a)(2)(B)). Because it is designed to deal with all but a narrow class of assets, section 3(18)(B) and section 8477(a)(2)(B) are by their nature more general than section 3(18)(A) or section 8477(a)(2)(A). Although the Department has indicated that it will not issue advisory opinions stating whether certain stated consideration is "adequate consideration" for the purposes of section 3(18), ERISA Procedure 76-1, § 5.02(a) (41 FR 36281, 36282, August 27, 1976), the Department recognizes that plan fiduciaries have a need for guidance in valuing assets, and that standards to guide fiduciaries in this area may be particularly elusive with respect to assets other than securities for which there is a generally recognized market. See, for example, *Donovan v. Cunningham*, 716 F.2d 1455 (5th Cir. 1983) (court encourages the Department to adopt regulations under section 3(18)(B)). The Department has therefore determined to propose a regulation only under section 3(18)(B) and section 8477(a)(2)(B). This proposal is described more fully below.

It should be noted that it is not the Department's intention by this proposed regulation to relieve fiduciaries of the responsibility for making the required determinations of "adequate

consideration" where applicable under the Act or FERSA. Nothing in the proposal should be construed as justifying a fiduciary's failure to take into account all relevant facts and circumstances in determining adequate consideration. Rather, the proposal is designed to provide a framework within which fiduciaries can fulfill their statutory duties. Further, fiduciaries should be aware that, even where a determination of adequate consideration comports with the requirements of section 3(18)(B) (or section 8477(a)(2)(B) of FERSA) and any regulation adopted thereunder, the investment of plan assets made pursuant to such determination will still be subject to the fiduciary requirements of Part 4 of Subtitle B of Title I of the Act, including the provisions of sections 403 and 404 of the Act, or the fiduciary responsibility provisions of FERSA.

B. Description of the Proposal

Proposed regulation 29 CFR 2510.3-18(b) is divided into four major parts. Proposed § 2510.3-18(b)(1) states the general rule and delineates the scope of the regulation. Proposed § 2510.3-18(b)(2) addresses the concept of fair market value as it relates to a determination of "adequate consideration" under section 3(18)(B) of the Act. Proposed § 2510.3-18(b)(3) deals with the requirement in section 3(18)(B) that valuing fiduciary act in good faith, and specifically discusses the use of an independent appraisal in connection with the determination of good faith. Proposed § 2510.3-18(b)(4) sets forth the content requirements for written valuations used as the basis for a determination of fair market value, with a special rule for the valuation of securities other than securities for which there is a generally recognized market. Each subsection is discussed in detail below.

1. General Rule and Scope.

Proposed § 2510.3-18(b)(1)(i) essentially follows the language of section 3(18)(B) of the Act and section 8477(a)(2)(B) of FERSA and states that, in the case of a plan asset other than a security for which there is a generally recognized market, the term "adequate consideration" means the fair market value of the asset as determined in good faith by the trustee or named fiduciary (or, in the case of FERSA, a fiduciary) pursuant to the terms of the plan and in accordance with regulations promulgated by the Secretary of Labor. Proposed § 2510.3-18(b)(1)(ii) delineates the scope of this regulation by establishing two criteria, both of which must be met for a valid determination of

adequate consideration. First, the value assigned to an asset must reflect its fair market value as determined pursuant to proposed § 2510.3-18(b)(2). Second, the value assigned to an asset must be the product of a determination made by the fiduciary in good faith as defined in proposed § 2510.3-18(b)(3). The Department will consider that a fiduciary has determined adequate consideration in accordance with section 3(18)(B) of the Act or section 8477(a)(2)(B) of FERSA only if both of these requirements are satisfied.

The Department has proposed this two part test for several reasons. First, Congress incorporated the concept of fair market value into the definition of adequate consideration. As explained more fully below, fair market value is an often used concept having an established meaning in the field of asset valuation. By reference to this term, it would appear that Congress did not intend to allow parties to a transaction to set an arbitrary value for the assets involved. Therefore, a valuation determination which fails to reflect the market forces embodied in the concept of fair market value would also fail to meet the requirements of section 3(18)(B) of the Act or section 8477(a)(2)(B) of FERSA.

Second, it would appear that Congress intended to allow a fiduciary a limited degree of latitude so long as that fiduciary acted in good faith. However, a fiduciary would clearly fail to fulfill the fiduciary duties delineated in Part 4 of Subtitle B of Title I of the Act if that fiduciary acted solely on the basis of naive or uninformed good intentions. See *Donovan v. Cunningham*, supra, 716 F.2d at 1467 ("[A] pure heart and an empty head are not enough.") The Department has therefore proposed standards for a determination of a fiduciary's good faith which must be satisfied in order to meet the requirements of section 3(18)(B) or section 8477(a)(2)(B) of FERSA.

Third, even if a fiduciary were to meet the good faith standards contained in this proposed regulation, there may be circumstances in which good faith alone fails to insure an equitable result. For example, errors in calculation or honest failure to consider certain information could produce valuation figures outside of the range of acceptable valuations of a given asset. Because the determination of adequate consideration is a central requirement of the statutory exemptions discussed above, the Department believes it must assure that such exemptions are made available only for those transactions possessing all the external safeguards envisioned by

Congress. To achieve this end, the Department's proposed regulation links the fair market value and good faith requirements to assure that the resulting valuation reflects market considerations and is the product of a valuation process conducted in good faith.

2. Fair Market Value

The first part of the Department's proposed two part test under section 3(18)(B) and section 8477(a)(2)(B) requires that a determination of adequate consideration reflect the asset's fair market value. The term "fair market value" is defined in proposed § 2510.3-18(b)(2)(i) as the price at which an asset would change hands between a willing buyer and a willing seller when the former is not under any compulsion to buy and the latter is not under any compulsion to sell, and both parties are able, as well as willing, to trade and are well-informed about the asset and the market for that asset. This proposed definition essentially reflects the well-established meaning of this term in the area of asset valuation. See, for example, 26 CFR 20.2031-1 (estate tax regulations); Rev. Rul. 59-60, 1959-1 Cum. Bull. 237; *United States v. Cartwright*, 411 U.S. 546, 551 (1973); *Estate of Bright v. United States*, 658 F.2d 999, 1005 (5th Cir. 1981). It should specifically be noted that comparable valuations reflecting transactions resulting from other than free and equal negotiations (e.g., a distress sale) will fail to establish fair market value. See *Hooker Industries, Inc. v. Commissioner*, 3 EBC 1849, 1854-55 (T.C. June 24, 1982). Similarly, the extent to which the Department will view a valuation as reflecting fair market value will be affected by an assessment of the level of expertise demonstrated by the parties making the valuation. See *Donovan v. Cunningham, supra*, 716 F.2d at 1468 (failure to apply sound business principles of evaluation, for whatever reason, may result in a valuation that does not reflect fair market value).¹

¹ Whether in any particular transaction a plan fiduciary is in fact well-informed about the asset in question and the market for that asset, including any specific circumstances which may affect the value of the asset, will be determined on a facts and circumstances basis. If, however, the fiduciary negotiating on behalf of the plan has or should have specific knowledge concerning either the particular asset or the market for that asset, it is the view of the Department that the fiduciary must take into account that specific knowledge in negotiating the price of the asset in order to meet the fair market value standard of this regulation. For example, a sale of plan-owned real estate at a negotiated price consistent with valuations of comparable property will not be a sale for adequate consideration if the negotiating fiduciary does not take into account any special knowledge which he has or should have about the asset or its market, e.g., that the

The Department is aware that the fair market value of an asset will ordinarily be identified by a range of valuations rather than a specific, set figure. It is not the Department's intention that only one valuation figure will be acceptable as the fair market value of a specified asset. Rather, this proposal would require that the valuation assigned to an asset must reflect a figure within an acceptable range of valuations for that asset.

In addition to this general formulation of the definition of fair market value, the Department is proposing two specific requirements for the determination of fair market value for the purposes of section 3(18)(B) and section 8477(a)(2)(B). First, proposed § 2510.3-18(b)(2)(ii) requires that fair market value must be determined as of the date of the transaction involving that asset. This requirement is designed to prevent situations such as arose in *Donovan v. Cunningham, supra*. In that case, the plan fiduciaries relied on a 1975 appraisal to set the value of employer securities purchased by an ESOP during 1976 and thereafter, and failed to take into account significant changes in the company's business condition in the interim. The court found that this reliance was unwarranted, and therefore the fiduciaries' valuation failed to reflect adequate consideration under section 3(18)(B). *Id.* at 1468-69.

Second, proposed § 2510.3-18(b)(2)(iii) states that the determination of fair market value must be reflected in written documentation of valuation² meeting the content requirements set forth in § 2510.3-18(b)(4). (The valuation content requirements are discussed below.) The Department has proposed this requirement in light of the role the adequate consideration requirement plays in a number of statutory exemptions from the prohibited transaction provisions of the Act. In determining whether a statutory exemption applies to a particular transaction, the burden of proof is upon the party seeking to make use of the statutory exemption to show that all the requirements of the provision are met. *Donovan v. Cunningham, supra*, 716 F.2d

property's value should reflect a premium due to a certain developer's specific land development plans.

² It should be noted that the written valuation required by this section of the proposal need not be a written report of an independent appraiser. Rather, it should be documentation sufficient to allow the Department to determine whether the content requirements of § 2510.3-18(b)(4) have been satisfied. The use of an independent appraiser may be relevant to a determination of good faith, as discussed with regard to proposed § 2510.3-18(b)(3), *infra*, but it is not required to satisfy the fair market value criterion in § 2510.3-18(b)(2)(i).

at 1467 n.27. In the Department's view, written documentation relating to the valuation is necessary for a determination of how, and on what basis, an asset was valued, and therefore whether that valuation reflected an asset's fair market value. In addition, the Department believes that it would be contrary to prudent business practices for a fiduciary to act in the absence of such written documentation of fair market value.

3. Good Faith

The second part of the Department's proposed two-part test under section 3(18)(B) and section 8477(a)(2)(B) requires that an assessment of adequate consideration be the product of a determination made in good faith by the plan trustee or named fiduciary (or under FERSA, a fiduciary). Proposed § 2510.3-18(b)(3)(i) states that as a general matter this good faith requirement establishes an objective standard of conduct, rather than mandating an inquiry into the intent or state of mind of the plan trustee or named fiduciary. In this regard, the proposal is consistent with the opinion in *Donovan v. Cunningham, supra*, where the court stated that the good faith requirement in section 3(18)(B):

is not a search for subjective good faith * * * The statutory reference to good faith in Section 3(18) must be read in light of the overriding duties of Section 404.

716 F.2d at 1467. The inquiry into good faith under the proposal therefore focuses on the fiduciary's conduct in determining fair market value. An examination of all relevant facts and circumstances is necessary for a determination of whether a fiduciary has met this objective good faith standard.

Proposed § 2510.3-18(b)(3)(ii) focuses on two factors which must be present in order for the Department to be satisfied that the fiduciary has acted in good faith. First, this section would require a fiduciary to apply sound business principles of evaluation and to conduct a prudent investigation of the circumstances prevailing at the time of the valuation. This requirement reflects the *Cunningham* court's emphasis on the use of prudent business practices in valuing plan assets.

Second, this section states that either the fiduciary making the valuation must itself be independent of all the parties to the transaction (other than the plan), or the fiduciary must rely on the report of an appraiser who is independent of all the parties to the transaction (other than the plan). (The criteria for determining

independence are discussed below.) As noted above, under ERISA, the determination of adequate consideration is a central safeguard in many statutory exemptions applicable to plan transactions with the plan sponsor. The close relationship between the plan and the plan sponsor in such situations raises a significant potential for conflicts of interest as the fiduciary values assets which are the subject of transactions between the plan and the plan sponsor. In light of this possibility, the Department believes that good faith may only be demonstrated when the valuation is made by persons independent of the parties to the transaction (other than the plan), *i.e.*, a valuation made by an independent fiduciary or by a fiduciary acting pursuant to the report of an independent appraiser.

The Department emphasizes that the two requirements of proposed § 2510.3-18(b)(3)(ii) are designed to work in concert. For example, a plan fiduciary charged with valuation may be independent of all the parties to a transaction and may, in light of the requirement of proposed § 2510.3-18(b)(3)(ii)(B), decide to undertake the valuation process itself. However, if the independent fiduciary has neither the experience, facilities nor expertise to make the type of valuation under consideration, the decision by that fiduciary to make the valuation would fail to meet the prudent investigation and sound business principles requirement of proposed § 2510.3-18(b)(3)(ii)(A).

Proposed § 2510.3-18(b)(3)(iii) defines the circumstances under which a fiduciary or an appraiser will be deemed to be independent for the purposes of subparagraph (3)(ii)(B), above. The proposal notes that the fiduciary or the appraiser must in fact be independent of all parties participating in the transaction other than the plan. The proposal also notes that a determination of independence must be made in light of all relevant facts and circumstances, and then delineates certain circumstances under which this independence will be lacking. These circumstances reflect the definitions of the terms "affiliate" and "control" in Departmental regulation 29 CFR 2510.3-21(e) (defining the circumstances under which an investment adviser is a fiduciary). It should be noted that, under these proposed provisions, an appraiser will be considered independent of all parties to a transaction (other than the plan) only if a plan fiduciary has chosen the appraiser and has the right to terminate that appointment, and the

plan is thereby established as the appraiser's client.³ Absent such circumstances, the appraiser may be unable to be completely neutral in the exercise of his function.⁴

4. Valuation Content—General

Proposed § 2510.3-18(b)(4)(i) sets the content requirements for the written documentation of valuation required for a determination of fair market value under proposed § 2510.3-18(b)(2)(iii). The proposal follows to a large extent the requirements of Rev. Proc. 66-49, 1966-2 C.B. 1257, which sets forth the format required by the IRS for the valuation of donated property. The Department believes that this format is a familiar one, and will therefore facilitate compliance. Several additions to the IRS requirements merit brief explanation.

First, proposed paragraph (b)(4)(i)(E) requires a statement of the purpose for which the valuation was made. A valuation undertaken, for example, for a yearly financial report may prove an inadequate basis for any sale of the asset in question. This requirement is intended to facilitate review of the valuation in the correct context.

Second, proposed paragraph (b)(4)(i)(F) requires a statement as to the relative weight accorded to relevant valuation methodologies. The Department's experience in this area indicates that there are a number of different methodologies used within the appraisal industry. By varying the treatment given and emphasis accorded relevant information, these methodologies directly affect the result of the appraiser's analysis. It is the Department's understanding that appraisers will often use different methodologies to cross-check their results. A statement of the method or methods used would allow for a more accurate assessment of the validity of the valuation.

³ The independence of an appraiser will not be affected solely because the plan sponsor pays the appraiser's fee.

⁴ With regard to this independence requirement the Department notes that new section 401(a)(28) of the Code (added by section 1175(a) of the Tax Reform Act of 1986) requires that, in the case of an employee stock ownership plan, employer securities which are not readily tradable on established securities markets must be valued by an independent appraiser. New section 401(a)(28)(C) states that the term "independent appraiser" means an appraiser meeting requirements similar to the requirements of regulations under section 170(a)(1) of the Code (relating to IRS verification of the value assigned for deduction purposes to assets donated to charitable organizations). The Department notes that the requirements of proposed regulation § 2510.3-18(b)(3)(iii) are not the same as the requirements of the regulations issued by the IRS under section 170(a)(1) of the Code. The IRS has not yet promulgated rules under Code section 401(a)(28).

Finally, proposed subparagraph (b)(4)(i)(G) requires a statement of the valuation's effective date. This reflects the requirement in proposed § 2510.3-18(b)(ii) that fair market value must be determined as of the date of the transaction in question.

5. Valuation Content—Special Rule

Proposed § 2510.3-18(b)(4)(ii) establishes additional content requirements for written documentation of valuation when the asset being appraised is a security other than a security for which there is a generally recognized market. In other words, the requirements of the proposed special rule supplement, rather than supplant, the requirements of paragraph (b)(4)(i). The proposed special rule establishes a nonexclusive list of factors to be considered when the asset being valued is a security not covered by section 3(18)(A) of the Act or section 8477(a)(2)(A) of FERSA. Such securities pose special valuation problems because they are not traded or are so thinly traded that it is difficult to assess the effect on such securities of the market forces usually considered in determining fair market value. The Internal Revenue Service has had occasion to address the valuation problems posed by one type of such securities—securities issued by closely held corporations. Rev. Rul. 59-60, 1959-1 Cum. Bull. 237, lists a variety of factors to be considered when valuing securities of closely held corporations for tax purposes.⁵ The Department's experience indicates that Rev. Rul. 59-60 is familiar to plan fiduciaries, plan sponsors and the corporate community in general. The Department has, therefore, modeled this proposed special rule after Rev. Rul. 59-60 with certain additions and changes discussed below. It should be emphasized, however, that this is a non-exclusive list of factors to be considered. Certain of the factors listed may not be relevant to every valuation inquiry, although the fiduciary will bear the burden of demonstrating such irrelevance. Similarly, reliance on this list will not relieve fiduciaries from the duty to consider all relevant facts and circumstances when valuing such securities. The purpose of the proposed

⁵ Rev. Rul. 59-60 was modified by Rev. Rul. 65-193 (1965-2 C.B. 370) regarding the valuation of tangible and intangible corporate assets. The provisions of Rev. Rul. 59-60, as modified, were extended to the valuation of corporate securities for income and other tax purposes by Rev. Rul. 68-609 (1968-2 C.B. 327). In addition, Rev. Rul. 77-287 (1977-2 C.B. 319), amplified Rev. Rul. 59-60 by indicating the ways in which the factors listed in Rev. Rul. 59-60 should be applied when valuing restricted securities.

list is to guide fiduciaries in the course of their inquiry.

Several of the factors listed in proposed § 2510.3-18(b)(4)(ii) merit special comment and explanation. Proposed subparagraph (G) states that the fair market value of securities other than those for which there is a generally recognized market may be established by reference to the market price of similar securities of corporations engaged in the same or a similar line of business whose securities are actively traded in a free and open market, either on an exchange or over the counter. The Department intends that the degree of comparability must be assessed in order to approximate as closely as possible the market forces at work with regard to the corporation issuing the securities in question.

Proposed subparagraph (H) requires an assessment of the effect of the securities' marketability or lack thereof. Rev. Rul. 59-60 does not explicitly require such an assessment, but the Department believes that the marketability of these types of securities will directly affect their price. In this regard, the Department is aware that, especially in situations involving employee stock ownership plans (ESOPs),⁶ the employer securities held by the ESOP will provide a "put" option whereby individual participants may upon retirement sell their shares back to the employer.⁷ It has been argued that some kinds of "put" options may diminish the need to discount the value of the securities due to lack of marketability. The Department believes that the existence of the "put" option should be considered for valuation purposes only to the extent it is enforceable and the employer has and may reasonably be expected to continue to have, adequate resources to meet its obligations. Thus, the Department proposes to require that the plan fiduciary assess whether these "put" rights are actually enforceable, and whether the employer will be able to pay for the securities when and if the "put" is exercised.

Finally, proposed subparagraph (I) deals with the role of control premiums in valuing securities other than those for

which there is a generally recognized market. The Department proposes that a plan purchasing control may pay a control premium, and a plan selling control should receive a control premium. Specifically, the Department proposes that a plan may pay such a premium only to the extent a third party would pay a control premium. In this regard, the Department's position is that the payment of a control premium is unwarranted unless the plan obtains both voting control and control in fact. The Department will therefore carefully scrutinize situations to ascertain whether the transaction involving payment of such a premium actually results in the passing of control to the plan. For example, it may be difficult to determine that a plan paying a control premium has received control in fact where it is reasonable to assume at the time of acquisition that distribution of shares to plan participants will cause the plan's control of the company to be dissipated within a short period of time subsequent to acquisition.⁸ In the Department's view, however, a plan would not fail to receive control merely because individuals who were previously officers, directors or shareholders of the corporation continue as plan fiduciaries or corporate officials after the plan has acquired the securities. Nonetheless, the retention of management and the utilization of corporate officials as plan fiduciaries, when viewed in conjunction with other facts, may indicate that actual control has not passed to the plan within the meaning of paragraph (b)(4)(ii)(I) of the proposed regulation. Similarly, if the plan purchases employer securities in small increments pursuant to an understanding with the employer that the employer will eventually sell a controlling portion of shares to the plan, a control premium would be warranted only to the extent that the understanding with the employer was actually a binding agreement obligating the employer to pass control within a reasonable time. See *Donovan v. Cunningham, supra*, 716 F.2d at 1472-74 (mere intention to transfer control not sufficient).

⁸ However, the Department notes that the mere pass-through of voting rights to participants would not in itself affect a determination that a plan has received control in fact, notwithstanding the existence of participant voting rights, if the plan fiduciaries having control over plan assets ordinarily may resell the shares to a third party and command a control premium, without the need to secure the approval of the plan participants.

6. Service Arrangements Subject to FERSA

Section 8477(c)(1)(C) of FERSA permits the exchange of services between the Thrift Savings Fund and a party in interest only in exchange for adequate consideration. In this context, the proposal defines the term "adequate consideration" as "reasonable compensation", as that term is described in sections 408(b)(2) and 408(c)(2) of ERISA and the regulations promulgated thereunder. By so doing, the proposal would establish a consistent standard of exemptive relief for both ERISA and FERSA with regard to what otherwise would be prohibited service arrangements.

Regulatory Flexibility Act

The Department has determined that this regulation would not have a significant economic effect on small plans. In conducting the analysis required under the Regulatory Flexibility Act, it was estimated that approximately 6,250 small plans may be affected by the regulation. The total additional cost to these plans, over and above the costs already being incurred under established valuation practices, are estimated not to exceed \$875,000 per year, or \$140 per plan for small plans choosing to engage in otherwise prohibited transactions that are exempted under the statute conditioned on a finding of adequate consideration.

Executive Order 12291

The Department has determined that the proposed regulatory action would not constitute a "major rule" as that term is used in Executive Order 12291 because the action would not result in: an annual effect on the economy of \$100 million; a major increase in costs of prices for consumers, individual industries, government agencies, or geographical regions; or significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States based enterprises to compete with foreign based enterprises in domestic or export markets.

Paperwork Reduction Act

This proposed regulation contains several paperwork requirements. The regulation has been forwarded for approval to the Office of Management and Budget under the provisions of the Paperwork Reduction Act of 1980 (Pub. L. 96-511). A control number has not yet been assigned.

⁶ The definition of the term "adequate consideration" under ERISA is of particular importance to the establishment and maintenance of ESOPs because, pursuant to section 408(e) of the Act, an ESOP may acquire employer securities from a party in interest only under certain conditions, including that the plan pay no more than adequate consideration for the securities.

⁷ Regulation 29 CFR 2550.408b-(j) requires such a put option in order for a loan from a party in interest to the ESOP to qualify for the statutory exemption in section 408(b)(3) of ERISA from the prohibited transactions provisions of ERISA.

Statutory Authority

This regulation is proposed under section 3(18) and 505 of the Act (29 U.S.C. 1003(18) and 1135); Secretary of Labor's Order No. 1-87; and sections 8477(a)(2)(B) and 8477(f) of FERSA.

List of Subjects in 29 CFR Part 2510

Employee benefit plans, Employee Retirement Income Security Act, Pensions, Pension and Welfare Benefit Administration.

Proposed Regulation

For the reasons set out in the preamble, the Department proposes to amend Part 2510 of Chapter XXV of Title 29 of the Code of Federal Regulations as follows:

PART 2510—[AMENDED]

1. The authority for Part 2510 is revised to read as follows:

Authority: Sec. 3(2), 111(c), 505, Pub. L. 93-406, 88 Stat. 852, 894, (29 U.S.C. 1002(2), 1031, 1135); Secretary of Labor's Order No. 27-74, 1-86, 1-87, and Labor Management Services Administration Order No. 2-6.

Section 2510.3-18 is also issued under sec. 3(18) of the Act (29 U.S.C. 1003(18)) and secs. 8477(a)(2)(B) and (f) of FERSA (5 U.S.C. 8477).

Section 2510.3-101 is also issued under sec. 102 of Reorganization Plan No. 4 of 1978 (43 FR 47713, October 17, 1978), effective December 31, 1978 (44 FR 1065, January 3, 1978); 3 CFR 1978 Comp. 332, and sec. 11018(d) of Pub. L. 99-272, 100 Stat. 82.

Section 2510.3-102 is also issued under sec. 102 of Reorganization Plan No. 4 of 1978 (43 FR 47713, October 17, 1978), effective December 31, 1978 (44 FR 1065, January 3, 1978), and 3 CFR 1978 Comp. 332.

2. Section 2510.3-18 is added to read as follows:

§ 2510.3-18 Adequate Consideration

(a) [Reserved]

(b)(1)(i) *General.* (A) Section 3(18)(B) of the Employee Retirement Income Security Act of 1974 (the Act) provides that, in the case of a plan asset other than a security for which there is a generally recognized market, the term "adequate consideration" when used in Part 4 of Subtitle B of Title I of the Act means the fair market value of the asset as determined in good faith by the trustee or named fiduciary pursuant to the terms of the plan and in accordance with regulations promulgated by the Secretary of Labor.

(B) Section 8477(a)(2)(B) of the Federal Employees' Retirement System Act of 1986 (FERSA) provides that, in the case of an asset other than a security for which there is a generally recognized market, the term "adequate consideration" means the fair market value of the asset as determined in good

faith by a fiduciary or fiduciaries in accordance with regulations prescribed by the Secretary of Labor.

(ii) *Scope.* The requirements of section 3(18)(B) of the Act and section 8477(a)(2)(B) of FERSA will not be met unless the value assigned to a plan asset both reflects the asset's fair market value as defined in paragraph (b)(2) of this section and results from a determination made by the plan trustee or named fiduciary (or, in the case of FERSA, a fiduciary) in good faith as described in paragraph (b)(3) of this section. Paragraph (b)(5) of this section contains a special rule for service contracts subject to FERSA.

(2) *Fair Market Value.* (i) Except as otherwise specified in this section, the term "fair market value" as used in section 3(18)(B) of the Act and section 8477(a)(2)(B) of FERSA means the price at which an asset would change hands between a willing buyer and a willing seller when the former is not under any compulsion to buy and the latter is not under any compulsion to sell, and both parties are able, as well as willing, to trade and are well informed about the asset and the market for such asset.

(ii) The fair market value of an asset for the purposes of section 3(18)(B) of the Act and section 8477(a)(2)(B) of FERSA must be determined as of the date of the transaction involving that asset.

(iii) The fair market value of an asset for the purposes of section 3(18)(B) of the Act and section 8477(a)(2)(B) of FERSA must be reflected in written documentation of valuation meeting the requirements set forth in paragraph (b)(4), of this section.

(3) *Good Faith*—(i) *General Rule.* The requirement in section 3(18)(B) of the Act and section 8477(a)(2)(B) of FERSA that the fiduciary must determine fair market value in good faith establishes an objective, rather than a subjective, standard of conduct. Subject to the conditions in paragraphs (b)(3) (ii) and (iii) of this section, an assessment of whether the fiduciary has acted in good faith will be made in light of all relevant facts and circumstances.

(ii) In considering all relevant facts and circumstances, the Department will not view a fiduciary as having acted in good faith unless

(A) The fiduciary has arrived at a determination of fair market value by way of a prudent investigation of circumstances prevailing at the time of the valuation, and the application of sound business principles of evaluation; and

(B) The fiduciary making the valuation either,

(1) Is independent of all parties to the transaction (other than the plan), or

(2) Relies on the report of an appraiser who is independent of all parties to the transaction (other than the plan).

(iii) In order to satisfy the independence requirement of paragraph (b)(3)(ii)(B), of this section, a person must in fact be independent of all parties (other than the plan) participating in the transaction. For the purposes of this section, an assessment of independence will be made in light of all relevant facts and circumstances. However, a person will not be considered to be independent of all parties to the transaction if that person—

(1) Is directly or indirectly, through one or more intermediaries, controlling, controlled by, or under common control with any of the parties to the transaction (other than the plan);

(2) Is an officer, director, partner, employee, employer or relative (as defined in section 3(15) of the Act, and including siblings) of any such parties (other than the plan);

(3) Is a corporation or partnership of which any such party (other than the plan) is an officer, director or partner.

For the purposes of this subparagraph, the term "control," in connection with a person other than an individual, means the power to exercise a controlling influence over the management or policies of that person.

(4) *Valuation Content.* (i) In order to comply with the requirement in paragraph (b)(2)(iii), of this section, that the determination of fair market value be reflected in written documentation of valuation, such written documentation must contain, at a minimum, the following information:

(A) A summary of the qualifications to evaluate assets of the type being valued of the person or persons making the valuation;

(B) A statement of the asset's value, a statement of the methods used in determining that value, and the reasons for the valuation in light of those methods;

(C) A full description of the asset being valued;

(D) The factors taken into account in making the valuation, including any restrictions, understandings, agreements or obligations limiting the use or disposition of the property;

(E) The purpose for which the valuation was made;

(F) The relevance or significance accorded to the valuation methodologies taken into account;

(G) The effective date of the valuation; and

(H) In cases where a valuation report has been prepared, the signature of the person making the valuation and the date the report was signed.

(ii) *Special Rule.* When the asset being valued is a security other than a security covered by section 3(18)(A) of the Act or section 8477(a)(2)(A) of FERSA, the written valuation required by paragraph (b)(2)(iii) of this section, must contain the information required in paragraph (b)(4)(i) of this section, and must include, in addition to an assessment of all other relevant factors, an assessment of the factors listed below:

(A) The nature of the business and the history of the enterprise from its inception;

(B) The economic outlook in general, and the condition and outlook of the specific industry in particular;

(C) The book value of the securities and the financial condition of the business;

(D) The earning capacity of the company;

(E) The dividend-paying capacity of the company;

(F) Whether or not the enterprise has goodwill or other intangible value;

(G) The market price of securities of corporations engaged in the same or a similar line of business, which are actively traded in a free and open market, either on an exchange or over-the-counter;

(H) The marketability, or lack thereof, of the securities. Where the plan is the purchaser of securities that are subject to "put" rights and such rights are taken into account in reducing the discount for lack of marketability, such assessment shall include consideration of the extent to which such rights are enforceable, as well as the company's ability to meet its obligations with respect to the "put" rights (taking into account the company's financial strength and liquidity);

(I) Whether or not the seller would be able to obtain a control premium from an unrelated third party with regard to the block of securities being valued, provided that in cases where a control premium is taken into account:

(1) Actual control (both in form and in substance) is passed to the purchaser with the sale, or will be passed to the purchaser within a reasonable time pursuant to a binding agreement in effect at the time of the sale, and

(2) It is reasonable to assume that the purchaser's control will not be dissipated within a short period of time subsequent to acquisition.

— (5) *Service Arrangements Subject to FERSA.* For purposes of determinations pursuant to section 8477(c)(1)(C) of FERSA (relating to the provision of services) the term "adequate consideration" under section 8477(a)(2)(B) of FERSA means "reasonable compensation" as defined in sections 408(b)(2) and 408(c)(2) of the Act and §§ 2550.408b-2(d) and 2550.408c-2 of this chapter.

(6) *Effective Date.* This section will be effective for transactions taking place after the date 30 days following publication of the final regulation in the Federal Register.

Signed in Washington, DC, this 11th day of May 1988.

David M. Walker,

Assistant Secretary, Pension and Welfare Benefits Administration, U.S. Department of Labor.

[FR Doc. 88-10934 Filed 5-16-88; 8:45 am]

BILLING CODE 4510-29-M

Test Report Federal Register

Tuesday
May 17, 1988

Part VII

Department of Transportation

Federal Aviation Administration

14 CFR Part 25

Improved Seat Safety Standards; Final
Rule

DEPARTMENT OF TRANSPORTATION**Federal Aviation Administration****14 CFR Part 25**

[Docket No. 25040; Amdt. No. 25-64]
RIN 2120-AA88

Improved Seat Safety Standards

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule.

SUMMARY: This amendment upgrades the standards for occupant protection during emergency landing conditions in transport category airplanes by revising the seat restraint requirements and by defining impact injury criteria. These changes are based on research testing and service experience and are intended to increase airplane occupant protection during emergency landing conditions.

EFFECTIVE DATE: June 16, 1988.

FOR FURTHER INFORMATION CONTACT:

Iven D. Connally, Regulations Branch (ANM-112), Transport Standards Staff, Aircraft Certification Division, FAA, Northwest Mountain Region, 17900 Pacific Highway South, C-68966, Seattle, Washington 98168; telephone (206) 431-2120.

SUPPLEMENTARY INFORMATION:**Background**

This amendment is based on Notice of Proposed Rulemaking (NPRM) No. 86-11, which was published in the *Federal Register* on July 17, 1986 (51 FR 25982). The notice proposed to upgrade the standards for occupant protection during emergency landing conditions in transport category airplanes by revising the crew and passenger seat restraint requirements and by defining impact injury criteria.

Transport category airplane seats are currently designed to meet the standards contained in § 25.785 (Seats, berths, safety belts, and harnesses), in § 25.561 (Emergency landing conditions), and in Technical Standards Order (TSO) C39b (Seats). Section 25.785(a) requires that each seat (including a crewmember seat as well as a passenger seat), berth, safety belt, harness, and adjacent part of the airplane be designed such that the occupant who experiences the inertial forces specified in § 25.561 will not suffer serious injury in an emergency landing. The inertial forces in § 25.561(b) are specified as ultimate forces experienced by the occupant and are treated as statically applied loads. The notice proposed to upgrade the static load factors defined in § 25.561 to the upward, downward, and sideward

directions, and to add an aft direction requirement.

Notice 86-11 also proposed adoption of new dynamic test standards for seats. The proposed standards would require the demonstration of both occupant response and seat/restraint system structural performance. They would provide a more representative evaluation of the interaction of the occupant, the seat, and the restraint system and yield data for impact injury analyses. Two dynamic test conditions were selected based on impact scenarios developed from analyses of survivable ground impact data. One test condition combines vertical and longitudinal loads to simulate ground impact following a high-rate vertical descent. This test condition emphasizes occupant vertical loading and evaluates the means provided to reduce spinal injury under the loads typically resulting from an impact of this nature. The second test, with a predominantly longitudinal component, simulates horizontal impact with a ground-level obstruction. This test condition provides an assessment of the occupant restraint system and seat structural performance. The selection of these two dynamic test conditions is consistent with the results of the crash scenario studies. These dynamic test standards are considered appropriate for all transport category airplanes, regardless of size.

An important part of any test procedure is the pass or fail criteria. The proposed rule would establish such criteria by defining standards that directly relate selected parameters measured during a dynamic test to injury criteria based on human impact injury limits. The performance criteria would be used to evaluate the occupant/seat protection system potential for preventing or minimizing serious injuries from both primary and secondary impacts. Of major concern are secondary head impacts which can inflict debilitating injuries and result in concussion and unconsciousness. The measure of potential head injury proposed in the notice is the Head Injury Criteria (HIC) used in Federal Motor Vehicle Safety Standard No. 208 (49 CFR 571.208). The HIC is applied when the results of the seat dynamic tests show that structure or other items of equipment are within the occupant's head strike envelope. The head acceleration time history is measured during the dynamic test and evaluated with the HIC when secondary impact can occur.

Spinal injuries also occur in airplane crashes. The Dynamic Response Index (DRI), which is based on a single, damped spring model of the spine and

respective support mass, has traditionally been used to predict probability of spinal injury in the performance evaluation of airplane ejection seats. The DRI has been correlated with ejection seat testing and service experience to provide a level of confidence for the application; however, inherent differences in function, geometry, dynamic pulse exposure, and occupant restraint between transport category airplane seats and ejection seats make direct application of the DRI questionable as a performance criterion for transport category airplane seats. A series of dynamic tests of seats in various impact orientations was studied by the FAA Civil Aeromedical Institute (CAMI) to correlate the DRI, determined from measured accelerations at the seat pan, to pelvic loads measured in the spinal base of a modified Part 572 (49 CFR Part 572) anthropomorphic dummy. Additional testing with transport category airplane seats with a lap belt restraint system indicated that the pelvic load peaks while the anthropomorphic dummy is still seated in a predominantly upright position. These tests confirm that the spinal load injury criteria can be used in assessing the dynamic performance of transport category airplane seats. Pelvic loads can be used in assessing the probability of spinal injury, and they are straight forward, easily measured, and require no additional analysis or interpretation. A maximum pelvic load of 1500 pounds would assure a low probability of spinal injury.

Leg injuries also occur in airplane crashes. While leg injuries alone may not be fatal, passengers may be temporarily incapacitated to the extent rapid evacuation of the airplane is not possible. An injured passenger, in an effort to escape, may block the escape route for several other passengers. Femur loads should therefore be measured during the dynamic tests where leg injuries may result from contact with seats or other structure. A measured axial load of 2250 pounds along each femur should not be exceeded during these tests. This is the same as the maximum allowed by Federal Motor Vehicle Safety Standard No. 208. This procedure provides an easily measured quantity that would require no additional analysis or interpretation.

Crash investigations have shown that localized cabin floor deformation can occur in survivable crashes. This has been confirmed by the controlled impact demonstration and drop tests involving transport category airplanes. The inability of some seats to accommodate

such deformations, remain in place, and restrain the occupants can contribute significantly to the degree of injury during a crash. The simulated floor deformation used in the dynamic tests, while not intended to be a measure of floor strength or deformation capability, will demonstrate the tolerance of the seat and its attachments to deformations that could occur in an actual crash.

The static strength requirements of § 25.561(b)(3) would be increased to provide a level of safety for seats and fixed items of mass consistent with the new dynamic test standards and accepted industry practice. It is expected that increased static strength requirements would assure a more uniform level of safety in the cabin floor structure, seat tracks, fittings, fixed items of mass, and in the seats. The increased lateral static strength and the added rearward static strength requirements would also improve the conditions for rapid evacuation during an emergency landing by limiting the obstruction of aisle space.

As proposed, the new seat safety standards would apply to all transport category airplanes for which an application for type certificate is made on or after the effective date, regardless of whether the airplanes are used in air carrier service. The new standards would not apply to airplanes for which application for type certificate is made prior to the effective date, nor to derivatives of such airplanes for which an application for an amended type certificate is made.

Discussion of Comments

The public response to requests for comments on Notice 86-11 demonstrates the wide interest shown in this rule. Comments were received from both airplane and seat manufacturers, from airplane operators, from organizations representing flightcrews, and from U.S. and foreign government agencies. All but two commenters support the FAA's objectives of enhancing the protection of occupants during emergency landing conditions through the use of new dynamic seat test methods and occupant injury criteria; however, several commenters are concerned that these requirements should apply only to future transport category airplane certifications. Most of the commenters also support improvements in the static strength requirements for seats and items of mass.

Several commenters requested extension of the public comment period. They argued that more testing was needed to verify the proposed criteria. The FAA considers that sufficient test data were available to the public to

generate meaningful comments on the notice within the allowed time. Newly designed seats have, in fact, been successfully tested using the proposed criteria.

Several commenters recommend static load factors less than those proposed in the notice. They are especially concerned with the side load factor of 4.5 when applied to all interior items. They believe the side load factor of 4.5 would be excessive and could cause significant weight penalties. They recommend a side load factor of 3.0 on the airframe and 4.0 on the seats. The proposed values were selected to take advantage of existing floor strength without requiring a significant structural weight increase. After further review of current airplane designs, both narrow body and wide body, the FAA agrees that a side load factor of 4.5 could add weight and cost to the structure without commensurate gains in safety. The higher load factors for seats, listed in TSO-C39b, are an attempt to represent the design ultimate load factor envelope for the typical airplane; i.e., the most critical location in the airplane for the most critical load condition (flight, ground, or emergency landing). The TSO values are usually higher than the airplane design load factors at the center of gravity and usually lower than these factors at the extreme forward and aft fuselage stations. The data indicate that the floor structure can withstand a side load factor of 3.0 without a significant weight penalty. This would provide a load factor capability of 4.0 on all attachments where the 1.33 factor applies (ref. § 25.785(i)(3)). The data and comments provided to the FAA indicate that load factors of 3.0 upward, 6.0 downward, 3.0 sideward, and 1.5 rearward are within the existing design ultimate strength envelope for most airplanes that would be affected by this rule and are adopted accordingly. One commenter requests clarification on where the 1.33 factor required by § 25.785 applies. The 1.33 factor applies only to the static design conditions of § 25.561.

One commenter states that the proposed increase in static side load factor from 1.5 to 4.5 would increase the ability of the seats to resist lateral deformation under crash conditions and would help maintain passable aisles for emergency evacuations. The FAA concurs that some increase in side load capability is needed. Although the current rule only requires a load factor of 1.5 for emergency landing conditions, most modern airplanes are capable of much higher loads. There is evidence to indicate that seats designed to a load factor of 3.0 have deformed in a

sideward direction. The data indicate that seats could be designed to withstand a sideward load factor of 4.0 (i.e., 3.0 times the 1.33 factor) without an appreciable increase in structural weight and, as noted above, this load factor is adopted accordingly.

Comments were received concerning the implications of the proposed revisions to § 25.561(b)(3) on other sections of Part 25 which incorporate the provisions of § 25.561 by reference. For instance, fuel tanks in the center section of the horizontal tail must withstand the fuel pressures resulting from the conditions of § 25.561 if they are within the fuselage contour. The applicability of § 25.561 remains unchanged in this regard, and the newly adopted load factors are applicable to the other sections of Part 25 that incorporate § 25.561 by reference as well.

One commenter suggests that galleys be equipped with fail-safe locking systems to avoid recurrent failure of drawers, bins, ovens, etc. Detail design requirements of latches are not the subject of this proposal; however, Advisory Circular (AC) 25.785-1, Flight Attendant Seat Requirements, provides guidance for latches on galleys.

One commenter states that items and structure which are fixed in cabin location should be designed only for the expected loads at their respective locations. The commenter further states that since seats tend to be of common construction, irrespective of cabin location, and may be relocated easily in service, it is reasonable to design all passenger seats to a maximum load factor. The current rules require that all items and structure must be designed to withstand the loads at their respective locations for all points within the structural design envelope, as well as the loads developed during emergency landing conditions. In this regard, nothing has changed from present certification practice.

One commenter suggests that aft-facing seats might prove superior in terms of both cost and passenger protection. The FAA concurs that aft-facing seats could be designed to provide greater support for the upper torso during crash load conditions; however, there are no currently available data to demonstrate that requiring the use of aft-facing seats would be cost effective, considering the increased weight associated with such seats and the improved occupant protection provided by this rule. Although this amendment permits the use of aft-facing seats, it does not require their use.

According to one commenter, a literal reading of proposed § 25.562(a)(2) would make compliance with this paragraph impossible to achieve. Accordingly, the sentence has been revised to read, "The occupant is exposed to loads resulting from the conditions prescribed in this section."

Several commenters object to the requirement to consider seat tracks misaligned with each other by 10 degrees vertically and one rail rolled 10 degrees to account for floor warpage. They point out that a requirement for the supporting structure to sustain these deformations as per proposed § 25.562(d)(8), while carrying the dynamic loads, is a severe condition outside of the current floor structural capability. The FAA agrees that to require the floor to withstand these deformations without failure would be outside the floor structural capability. The 10-degree misalignment required for testing of seats is intended only to assure a degree of flexibility in the seat structure and floor attachments and is not meant to be a measure of floor structural capability. For this reason, only the forward test condition (§ 25.562(b)(2)) requires the 10-degree deformation for testing. Section 25.562 is therefore revised accordingly.

One commenter believes the proposed § 25.562(c) is unclear as to whether these deformations have to be imposed prior to the dynamic tests or whether it is acceptable to show that they have been achieved, or exceeded, during the course of the tests. This commenter also believes the rail misalignment conditions are not necessarily appropriate to all airplanes and that provision should be made for use of alternative definitions of seat support structure deformation. The reason for testing with deformations is to assure that the seats and attachments will carry the dynamic loads even though the tracks have been distorted. The 10 degrees of track and floor warpage are imposed prior to the dynamic tests. Any seat deformation caused by the test will be recorded for use in the assessment of blockage of emergency egress. Although the majority of transport airplanes use tracks to attach seats to the floor structure, the misalignment conditions specified for the dynamic tests also apply to other types of seat-to-floor attachment fittings. It is expected that acceptable limits on deformation will be included in proposed AC 25.562-1 (51 FR 25990; July 17, 1986), and seat manufacturers will supply measured deformations to the installer.

Several commenters interpret proposed § 25.562(c) to require that each

seat model and its attachments be tested with unique airframe support structure. The rule does not require seats and their attachments to be tested with unique floor structure. Tests may be conducted on a rigid test fixture with representative seat tracks installed.

Several comments were received concerning the use of various analytical methods. One commenter recommends application of automobile dynamic impact analysis to aircraft. Another commenter suggests that a rational analysis be allowed as an alternative for dynamic seat tests or for adjusting the dynamic pulse to account for aircraft size. The FAA will consider the analytical method as a means of certification only when sufficient experience is available to demonstrate that the analytical methods can accurately predict the site and mechanism of failure of a seat/restraint system, and can accurately predict the injury criteria obtained in dynamic tests for a wide variety of seat designs. At the present time, rational analysis would be allowed only to demonstrate that seats are less critical than similar "worst case" seats which have successfully passed dynamic testing. There is no valid method to adjust the dynamic pulse for aircraft size, material, construction technique, operating environment, or other factors. The dynamic pulse was selected primarily to provide an effective test environment for seat and restraint system evaluation.

One seat manufacturer states that testing of each seat is impractical and suggests that § 25.562(b) be reworded to read, "Each seat type approved * * * must successfully complete dynamic tests or be demonstrated by rational analysis based on dynamic tests * * *." The FAA concurs with this recommendation, and § 25.562(b) has been revised accordingly. The FAA does not concur with the suggestion that static minimums should be verified by actual testing rather than by analytical methods. Structural static analysis may be used if the structure conforms to that for which experience has shown this method to be reliable.

Some commenters suggest that crew seats, including flight attendant seats attached to bulkheads and galleys, should be subjected to static tests only. The FAA does not concur. There is no justification for providing a lower level of safety for crewmembers. Also, there is no way to demonstrate injury protection parameters (injury criteria) with static tests. One commenter suggests use of submarining indicators on the pelvis of the dummy to permit objective assessment of belt retention.

While this may be a good idea, it requires a dummy with a special pelvis, which is costly and not commonly available. Submarining action can also be detected by inspection of the dummy after the test and by careful review of the test films.

One commenter provided analysis to support the position that the pulse shape for both vertical and longitudinal tests should be a triangular dynamic pulse, peaking at 14g with a rise time of 0.08 seconds and a velocity change of 35 feet per second. Comments from related industries were submitted to support that position. The analysis is based on full-scale controlled crash data, and selects velocity change intervals which are claimed to represent the structural limit at which the fuselage breaks up. The FAA does not concur with the level of survivability selected by the commenter to establish his proposed pulse. While localized fuselage breakup did occur in these test airplanes, the fuselage maintained a protective shell and limited acceleration loads to a survivable level in all areas outside of the local fracture. Airplane accident experience confirms that observation and has demonstrated that localized fuselage breakup is not the limit on overall passenger survivability. Moreover, data submitted to the FAA indicate that many seats currently in service are capable of meeting the recommended 35 feet per second and 14g criteria. One commenter believes that seats designed to meet the standards proposed in the NPRM would be practical, feasible, and consistent with current floor strength levels if the seat is designed properly. Recent tests support this belief.

Two commenters contend that it is unnecessary to introduce dynamic testing. They believe that the mode of load application for static testing used by the British Civil Aviation Authority should be used, together with the addition of floor deformation per proposed § 25.562(c). The FAA disagrees. Although improved static test methods could be used to evaluate the structural integrity of the seat, these methods cannot evaluate the ability of the seats to protect passengers and crewmembers from injury. Also, one commenter suggests that dynamic testing may be too complicated (dummy, HIC, two rows, cabin interior), and that a simple drop test of a seat with accelerometers, no anthropomorphic dummy, and no expensive test equipment could be used. The FAA disagrees. No simple dynamic test has been developed which will provide human-like load distribution on a seat/

restraint system without using an anthropomorphic dummy. Several efforts have been made without using a dummy, but without success. Moreover, the simple test would not provide any measure of passenger injury protection.

One commenter supports the proposal, but would prefer 20g and similar dynamic tests for items of mass. Designing a seat to meet a 20g dynamic test condition without defining the velocity change and energy level associated with the dynamic pulse would not, in itself, assure a higher level of safety. Seats designed to meet the 16g and 44 feet per second criteria could also be shown to react 20g dynamic loads at an equivalent energy level. Strengthening the floor structure to carry the 20g dynamic load with a 44 feet per second change in velocity would add considerable weight to the structure and could not be shown cost effective. Static criteria are sufficient to evaluate the structural strength and retention characteristics of items of mass where occupant injury assessments are not required.

One commenter argues that specific load values of 2,250 pounds in each femur should be deleted and the rule stated in objective terms. Padding the lower rear edge of the seat is suggested as an alternative. The reason for specifying the 2,250-pound maximum allowable femur load value is to have an objective pass/fail performance criterion. It may be achieved through energy absorbing designs, including padding if appropriate, by clearance for the legs, or by whatever other designs are appropriate.

Several commenters state that more dynamic testing is needed to understand the relationships between seat pitch, bulkhead distance, strike zone from the 10-degree yaw, and the femur loads and HIC. A continuing dynamic test program at the CAMI test facility, which has had the participation of airframe and seat manufacturers, has given a better understanding of the various design parameters affecting the HIC and femur loads. Based on the results of these tests, the FAA believes these design requirements are realistic and achievable without paying an undue design penalty.

One commenter suggests that upper torso restraint for passengers to minimize secondary head impact should be considered, since a HIC less than 1000 would not ensure a conscious passenger. While a HIC of 1000 might not ensure a conscious passenger, it should prevent a fatal head injury in a serious crash. The rule does not prohibit installation of upper torso restraints; however, installation of upper torso

restraint systems for passengers on transport airplanes could create significant design problems, such as structural weight penalties associated with the stronger seat back and floor structure, and shoulder straps could create entanglement problems during emergency egress. The new standards for seat performance provide a significant increase in passenger survivability during emergency landing conditions with only lap belt restraints.

Several comments were received regarding specific aspects of the test procedures and compliance criteria (pass/fail criteria, defining critical conditions, etc.). Guidance regarding test procedures, along with acceptable means of compliance, will be provided in the final release of AC 25.562-1.

Several commenters express concern that the cost analysis is inaccurate in that it underestimates the costs associated with the proposed rule. Others state that the costs are overestimated. A revised cost analysis has been prepared which reflects changes in the proposed rule and more accurate estimates of benefits and costs. The revised benefit and cost estimates improve the benefit to cost ratio from the original estimate prepared for the notice.

Several commenters are concerned about the applicability of the new seat requirements to future and current airplanes. Some believe that it should apply to the existing fleet as well as to future certification. Others express concern over possible changes to Part 121 which would make the new standards applicable to current airplanes. They are also concerned that if the Part 25 rule were adopted, they would have to use seats manufactured to meet the new standards, regardless of whether Part 121 was amended, because seats meeting current standards would no longer be produced. The FAA believes seats designed to the new performance standards could also be used in older airplanes without creating an undue economic burden. Seats meeting the new standards could be phased in during major interior modification or during refurbishment, if desired. However, the FAA will not, by virtue of this amendment, require an upgrade of the static strength standards on fixed items of mass, nor require the replacement of seats in airplanes manufactured under existing type certificates. The Airport and Airway Safety and Capacity Expansion Act of 1987 (Pub. L. 100-223, December 30, 1987) directs the Secretary of Transportation to initiate rulemaking to consider the retrofit on air carrier aircraft of seats that meet improved

crashworthiness standards. The FAA expects to initiate such rulemaking shortly, and comments submitted in response to Notice 86-11 regarding the issue of retrofit will be considered.

The airplane manufacturers, through the Aerospace Industries Association (AIA), submitted a cost analysis covering three separate proposals. Their proposals were grouped I through III, based on cost effectiveness, and range from most expensive to least expensive.

The Group I analysis was based on the erroneous assumption that the rule changes would require that the seat dynamic testing be accomplished on representative aircraft floor structure, and that the aircraft floor structure would thus have to accommodate the floor deformation specified in the rule without failure. This analysis also assumed that all the requirements proposed in the NPRM would be adopted. The Group II analysis was based on the assumption that the seat dynamic testing would be accomplished on a test fixture, rather than on aircraft floor structure, but otherwise equivalent to the Group I assumptions. The Group III analysis was based on the assumption that the static side load factor of § 25.561(b)(3) was increased to 3.0g, an aft load factor of 1.5g was added, the seat static side load factor was 4.0g, and the dynamic test conditions for seat assembly tests were reduced. They estimate that the additional weight increase for seats designed under the Group I or Group II assumptions would be 0.6 pounds per seat, and 0.3 pounds per seat under the Group III assumptions. They estimate that there would be no airframe weight increase for the Group III assumptions. The rule, as adopted, closely corresponds to the Group III assumptions for the airframe; therefore, no significant airframe weight increase is anticipated. The rule corresponds to the Group II assumptions for seat dynamic testing, where analysis indicates a seat weight increase of 0.6 pounds per seat would be anticipated; however, seat manufacturers have indicated that seats complying with the standards proposed in the NPRM have been developed at a weight penalty of only 0.3 pounds per seat. In either case, the projected weight increase (0.9 to 1.8 pounds for a triple-seat assembly) is well within the variation of seat weight among seat models competing successfully in the current market.

Except as discussed above, the proposals in Notice 86-11 are adopted as proposed.

Regulatory Evaluation Summary

This regulatory evaluation will primarily address the passenger seat. Although the rule also prescribes standards for the flight attendant and flightcrew seats, these seats are expected to have costs and benefits that are similar to those of the passenger seat. In addition, they represent a relatively small economic impact compared to passenger seats. The airplane structure on new type designs is expected to require only minor modification. For this reason, only a negligible cost impact is anticipated.

The benefits and the costs of requiring improved seat performance are both directly proportional to the number of seats; that is, the total cost is equal to the number of seats times the cost per seat and the total benefits are equal to the number of seats times the benefit per seat. Therefore, one can calculate the relationship between benefits and costs by determining the benefits per seat and the cost per seat, and this will be the approach used in this evaluation.

Benefits

The final rule will improve the crashworthiness of transport category airplanes by revising the seat standards. Because of the improved standards, some lives are expected to be saved that otherwise may not have been.

It is difficult to determine, accurately, the potential reduction in casualty loss that may result from this rule because it involves estimating casualty loss that would occur from use of presently designed seats that would not occur from use of seats designed to the improved standards. In reviews of accidents, identification of fatalities or injuries caused by insufficient seat strength or seat attachment deficiencies is difficult because of incomplete knowledge of the crash dynamics, injury mechanisms, and survivor testimony relating to the crash. In addition, post-crash fires consume necessary data. Nevertheless, there are some data available which can offer insight into prospective benefits.

The FAA has reviewed many accidents to determine seat performance. In fact, in March 1983, the FAA published a study, "Crash Injury Protection in Survivable Air Transport Accidents—U.S. Civil Aircraft Experience From 1970 to 1978," relating to the issue of seat adequacy. As part of that study, a comprehensive data base was developed on passenger seat/restraint system performance in survivable transport category airplane accidents. The study drew the following conclusions:

Although injuries and fatalities seem to be decreasing in the more recent survivable crashes, seat performance continues to be a factor in these crashes. Failures range from seat pan collapse to complete breakaway of the seat assembly from the floor are reported. Floor or cabin deformation frequently is a cause of seat failure. Flailing injuries, due to either bending over the restraint system or secondary impact with the aircraft interior, appear to be common.

The National Aeronautics and Space Administration (NASA) and the FAA jointly sponsored parallel studies by Lockheed, McDonnell Douglas, and Boeing to identify areas of research and approaches that may result in improved occupant survivability and crashworthiness of transport category airplanes.

The Boeing study involved accidents involving international airlines as well as U.S. airlines. Boeing concluded that the aircraft strength and occupant injury tolerance appear to be in proper balance in 31 accidents in which seat performance was mentioned in NTSB reports. Douglas stated that it was premature to evaluate seat performance and recommended a test program. Lockheed stated that the results of the review of the seat performance indicate that the seats and restraint systems designed to current FAA criteria are providing a system that protects the occupant.

The FAA contracted with Simula, Inc., and RMS Technologies, Inc., to do a study of severe survivable accidents between 1970 and 1983. The study, among other things, identifies instances where an improved seat/restraint system might have been beneficial. The results of the study were published in a report titled *Crash Dynamics Program Transport Seat Performance and Cost Benefit Study*, October 1986. The Regulatory Evaluation for the NPRM was based on the 1983 FAA study since that was the latest study available at the time. The accident data base for this Regulatory Evaluation will be based on the Simula/RMS Technologies study. This later study reviewed the previous studies, included additional accident data for the period 1979 through 1983, and more clearly related cause and effect, that is, associated fatalities and injuries with seat failure. For example, in the NPRM it was stated that there were 368 fatalities and 346 serious injuries to passengers involved in accidents where seats could have been a contributing factor over the period 1970 to 1978, whereas in the Simula/RMS Technologies study it is stated that at least 107 fatalities and 63 serious injuries had the potential of being

avoided through the use of improved seats over the period 1970 to 1983.

During the fourteen year period between 1970 and 1983, there were 3,343 million passenger enplanements on U.S. air carriers. Therefore, the casualty rate where improved seats could have been of benefit is 0.0320 fatalities per million passenger enplanements (107 fatalities divided by 3,343 million passenger enplanements) and 0.0188 serious injuries per million passenger enplanements.

The question arises of how effective an improved seat would have been in preventing the 107 fatalities and 63 serious injuries. In reality, the improved seats would not be 100 percent effective in preventing these deaths and injuries. In the NPRM it was estimated that the improved seat would be from 3 to 15 percent effective in preventing casualty loss of a much larger accident base, that is the improved seat would prevent from 0.00532 fatalities per million passenger enplanements to 0.0266. In reviewing the accidents discussed in the Simula/RMS Technologies study and the ability of the improved seats to match the strength and resiliency of the airplane floor, the FAA estimates that the improved seat would be at least 80 percent effective in preventing the casualty loss described in the study. The effectiveness is based on judgments made as the accident files were reviewed as to whether an injury or fatality was of the type that could have been prevented by an improved seat. It is also apparent that available accident records do not identify all seat related casualty loss. A correction for this lack of data, as indicated in the report, would more than compensate for the assumption associated with other than 100 percent effectiveness. Therefore, in this analysis the fatality rate (0.0320 fatalities per million passenger enplanements) calculated above will be used. The impact of variations in effectiveness of the improved seat will be discussed in the section on sensitivity.

To determine the benefits per seat, the number of enplanements per seat has to be developed. The FAA forecast indicates that there will be about 681,000 seats in the fleet in 1995. That year was used as the point when newly certificated airplanes would be entering the fleet. The number of enplanements for 1995 is forecast at 693.5 million. Therefore, the number of enplanements per seat per year is 1.018 (693.5 million enplanements divided by 681,000 seats). As indicated above, the fatality rate avoided as a result of improved seats is 0.0320 fatalities per million passenger enplanements. Therefore, the number of

fatalities avoided per million seats per year is 32.58 (0.0320 fatalities per million passenger enplanements times 1,018 enplanements per seat per year). For the purpose of analysis, the FAA has used the statistical minimum economic value of a human life of \$1 million. This is the accepted value used by economists in Government policy analysis. Using this value, the benefit per year per seat is \$32.58. Because a serious injury is estimated to cost society less than 10 percent of the cost of a fatality, and the reduction in serious injuries is less than that for fatalities, serious injuries will be neglected for the purpose of comparing benefits and costs.

The service life of a seat can vary widely. Some seats have been providing service in excess of 20 years. Others are replaced because airlines want to reconfigure cabins or desire seats with lower weight or maintenance costs. For the purpose of this analysis, the service life of a seat is assumed to be 7 years. This is in contrast to the ten years used in the Initial Regulatory Evaluation for the NPRM. It is based on additional discussions with the airline industry and makes the benefit estimate more conservative. The present value of benefits per seat is about \$159 (7 year life, 10 percent discount rate).

In the Initial Regulatory Evaluation for the NPRM, the number of enplanements per seat was based on historical data during the 1970s. It was brought to the agency's attention that present and prospective data indicate that seats are being used more intensely, that is, load factors are higher and airplanes are being used more hours per day. Therefore, enplanements per seat for the year 1995 is used in this analysis. Also, in the analysis for the NPRM, the prospective accident rate compared to the historical rate was reduced by one-half based on improvements being made in the aviation system. It was difficult to corroborate this by means of statistical analysis, and it will be discussed in the section on sensitivity.

Costs

This cost analysis is based on the one developed for the NPRM and the comments received in response to that document. The two basic elements of the seat cost are the increase in manufacturing cost and the cost impact of any weight increase. Seats for transport category airplanes currently cost about \$1,200 and weigh about 19 to 22 pounds per passenger.

The cost for a newly designed seat consists of fixed and variable (or recurring) cost elements. The fixed costs are composed of the following:

1. Engineering design.

2. Construction of prototypes.
3. Development and certification testing.
4. Tooling and training.
5. Documentation.

The seat manufacturers became aware that the FAA was investigating the merits of introducing improved seat standards several years ago and were informed of the details of the FAA proposals with publication of the NPRM in July 1986. As a result of this knowledge, as well as their desire to offer the safest product possible, the seat manufacturers began to develop seats to the proposed standards. Similarly, the airline operators started to specify that seats must meet the proposed standards. Several seat manufacturers are already selling seats which meet the proposed standards. Therefore, development costs can be considered as sunk costs.

The variable costs or recurring costs consist of the materials, labor, and expendables used in the manufacture of the seat. The additional materials are likely to be less than 2 or 3 pounds of metal, including scrap, and thus contribute only modestly to cost. Additional labor requirements are also expected to be modest since basically the same work tasks will be done as are now. For example, the time to forge two similar but slightly different structural elements is likely to be the same. The FAA estimates the increase in fabrication costs to be about 3 percent or about \$36 per seat. Of the several seat manufacturers that commented in response to the NPRM, only one made a cost estimate. That estimate was that there would be a 3 percent increase in sales price as a result of the new standard. This is less than the FAA estimate since it includes all costs, both fixed and variable.

The increase in weight of the structure that is expected to result from this rule cannot be determined with any certainty. The FAA estimates the weight increase to be 0.6 pounds. Estimates from the seat manufacturers in response to the NPRM ranged from 0.3 pounds to 1.5 pounds per seat. Each pound of weight increase can result in 15 gallons of additional fuel burn per year. At 60 cents per gallon, the weight increase would cost \$5.40 per year (i.e., 0.6 pounds weight increase times 15 gallons per pound times \$.60 per gallon).

The annual seat cost is developed by annualizing the seat fabrication cost over a seven year period and adding it to the annual fuel cost. The annual seat cost is \$12.79. The present value seat cost is \$62.29.

The FAA expects that, with the exception of seats, there will be no

significant modification of the airplane structure, its interior furnishings, or the seat restraint systems, such as seat belts, as a result of the rule. The FAA therefore estimates that there will be only negligible additional costs for these items. Several commenters questioned this estimate, and their comments were addressed in the section "Discussion of Comments."

Comparison of Benefits and Costs

As indicated in the section on benefits, the present value of benefits per seat is \$159; the costs are about \$62, yielding a benefit to cost ratio of 2.6.

Sensitivity

As stated previously, there is some uncertainty with respect to the FAA estimates of costs and benefits. The critical estimates are discussed below.

Life of Seat

In this analysis, it was estimated that the life of a seat is seven years. There is a greater probability that the life of a seat is greater than seven years rather than less. If, for example, the life of a seat were 10 years, the benefit to cost ratio would be 2.9 compared to 2.6.

Effectiveness of Seat

In this analysis, improved seats were estimated to be highly effective in preventing fatalities in which seats were judged to be the cause. It is recognized that the seats will not be 100 percent effective, but on the other hand, the Simula/RMS study stated that there were additional fatalities, due to seats, that could not be identified. In light of these two unquantifiable, off-setting factors, the FAA used the Simula/RMS numbers without adjustment. The FAA assumed that, had the improved seats been installed during the period studied by Simula/RMS, 107 lives could have been saved. The FAA also assumed a linear relationship between the effectiveness of the improved seats and the number of fatalities prevented. If, for example, the improved seat prevented only half of the fatalities estimated, the benefit to cost ratio would be 1.3 rather than 2.6.

"Value" of a Life

The "value" of a life is open to much debate and much has been written in the literature on that subject. The FAA uses \$1 million for the "value" of a life for analysis purposes. The benefit to cost ratio will vary directly with the value, that is, if the value were \$2 million, the benefit to cost ratio would be 5.2 rather than 2.6. The value must be at least

\$385,000 for a benefit to cost ratio greater than one, in this analysis.

Future Accident Rate

The accident data for this analysis covered the period 1970 through 1983. The prospective accident rate in this analysis was assumed to be the same as in that period. Since accidents are relatively rare events, a single accident can change trends. If it is assumed that the prospective accident rate will be 50 percent of the historical rate, the benefit to cost ratio will be 1.3 rather than 2.6.

Cost of a Seat

The cost of a seat is made up of two elements, the sales price and the cost impact of any weight change. The present value of the sales price and of the weight change (0.6 pound) are \$36 and \$26, respectively. If the weight change were 1.2 pounds rather than 0.6 pound, the benefit to cost ratio would be 1.8, and if the sales price were increased \$72 rather than \$36, the benefit to cost ratio would be 1.6 rather than 2.6. If both the weight and price were to double, the benefit to cost ratio would be 1.3 rather than 2.6.

Trade Impact Assessment

The rule will have little or no impact on trade for both U.S. firms doing business in foreign countries and foreign firms doing business in the United States. Foreign firms seeking U.S. approval for their products must also meet the new standards. Most likely, the foreign airworthiness authorities will impose similar standards on products, of whatever origin, approved in their countries. Therefore, there should be no competitive advantage to anyone. There were no comments with respect to trade impact.

Regulatory Flexibility Determination

The Regulatory Flexibility Act of 1980 (RFA) was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by Government regulations. The RFA requires agencies to review rules which may have "a significant economic impact on a substantial number of small entities."

This rule amends 14 CFR Part 25. Part 25 prescribes airworthiness standards for the issue of type certificates for transport category airplanes. The FAA size threshold for a determination of a small entity for aircraft manufacturers is 75 employees; that is, an aircraft manufacturer with more than 75 employees is considered not to be a small entity. The manufacturers of transport category airplanes such as Boeing, Gates Learjet, and McDonnell

Douglas, are all large manufacturers. Therefore, it is clear that this rule does not impact small entities. There were no comments relating to the impact on small business.

Additional Information

Additional information relating to the regulatory evaluation is contained in a more detailed evaluation which is available in the docket.

Federalism Implications

The regulations set forth in this amendment are promulgated pursuant to the authority in the Federal Aviation Act of 1958 (Act), as amended (49 U.S.C. 1301, *et seq.*), which statute is construed to preempt state law regulating the same subject. Section 601(a)(1) of the Act empowers the Administrator of the FAA to promote safety of flight of civil aircraft in air commerce by prescribing minimum standards governing the design, materials, workmanship, construction, and performance of aircraft. Thus, in accordance with Executive Order 12612, it is determined that such regulations do not have federalism implications warranting the preparation of a Federalism Assessment.

Conclusion

For the reasons given earlier in the preamble, the FAA has determined that this is not a major regulation as defined in Executive Order 12291. In addition, the FAA certifies that this rule does not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act, since none are affected. Since this regulatory document concerns a matter on which there is substantial public interest, the FAA has determined that this document is significant as defined in Department of Transportation Regulatory Policies and Procedures (44 FR 11034; February 26, 1979).

List of Subjects in 14 CFR Part 25

Air transportation, Aircraft, Aviation safety, Safety.

Adoption of the Amendment

Accordingly, Part 25 of the Federal Aviation Regulations (FAR), 14 CFR Part 25, is amended as follows:

PART 25—AIRWORTHINESS STANDARDS: TRANSPORT CATEGORY AIRPLANES

1. The authority citation for Part 25 continues to read as follows:

Authority: 49 U.S.C. 1344, 1354(a), 1355, 1421, 1423, 1424, 1425, 1428, 1429, 1430; 49

U.S.C. 106(g) (Revised Pub L. 97-449, January 12, 1983); and 49 CFR 1.47(a).

2. By amending § 25.561 by revising paragraphs (b)(3) (i), (ii), (iii) and (iv), and by adding new paragraphs (b)(3) (v) and (d) to read as follows:

§ 25.561 General.

- (b) * * *
- (3) * * *
- (i) Upward, 3.0g
- (ii) Forward, 9.0g
- (iii) Sideward, 3.0g on the airframe; and 4.0g on the seats and their attachments.
- (iv) Downward, 6.0g
- (v) Rearward, 1.5g

(d) Seats and items of mass (and their supporting structure) must not deform under any loads up to those specified in paragraph (b)(3) of this section in any manner that would impede subsequent rapid evacuation of occupants.

3. By adding a new § 25.562 to read as follows:

§ 25.562 Emergency landing dynamic conditions.

(a) The seat and restraint system in the airplane must be designed as prescribed in this section to protect each occupant during an emergency landing condition when—

(1) Proper use is made of seats, safety belts, and shoulder harnesses provided for in the design; and

(2) The occupant is exposed to loads resulting from the conditions prescribed in this section.

(b) Each seat type design approved for crew or passenger occupancy during takeoff and landing must successfully complete dynamic tests or be demonstrated by rational analysis based on dynamic tests of a similar type seat, in accordance with each of the following emergency landing conditions. The tests must be conducted with an occupant simulated by a 170-pound anthropomorphic test dummy, as defined by 49 CFR Part 572, Subpart B, or its equivalent, sitting in the normal upright position.

(1) A change in downward vertical velocity (Δv) of not less than 35 feet per second, with the airplane's longitudinal axis canted downward 30 degrees with respect to the horizontal plane and with the wings level. Peak floor deceleration must occur in not more than 0.08 seconds after impact and must reach a minimum of 14g.

(2) A change in forward longitudinal velocity (Δv) of not less than 44 feet per second, with the airplane's longitudinal axis horizontal and yawed 10 degrees

either right or left, whichever would cause the greatest likelihood of the upper torso restraint system (where installed) moving off the occupant's shoulder, and with the wings level. Peak floor deceleration must occur in not more than 0.09 seconds after impact and must reach a minimum of 16g. Where floor rails or floor fittings are used to attach the seating devices to the test fixture, the rails or fittings must be misaligned with respect to the adjacent set of rails or fittings by at least 10 degrees vertically (i.e., out of Parallel) with one rolled 10 degrees.

(c) The following performance measures must not be exceeded during the dynamic tests conducted in accordance with paragraph (b) of this section:

(1) Where upper torso straps are used for crewmembers, tension loads in individual straps must not exceed 1,750 pounds. If dual straps are used for restraining the upper torso, the total strap tension loads must not exceed 2,000 pounds.

(2) The maximum compressive load measured between the pelvis and the lumbar column of the anthropomorphic dummy, must not exceed 1,500 pounds.

(3) The upper torso restraint straps (where installed) must remain on the occupant's shoulder during the impact.

(4) The lap safety belt must remain on the occupant's pelvis during the impact.

(5) Each occupant must be protected from serious head injury under the

conditions prescribed in paragraph (b) of this section. Where head contact with seats or other structure can occur, protection must be provided so that the

head impact does not exceed a Head Injury Criterion (HIC) of 1,000 units. The level of HIC is defined by the equation:

$$HIC = \left\{ (t_2 - t_1) \left[\frac{1}{(t_2 - t_1)} \int_{t_1}^{t_2} a(t) dt \right]^{2.5} \right\}_{\max}$$

Where:

t_1 is the initial integration time,

t_2 is the final integration time, and

$a(t)$ is the total acceleration vs. time curve for the head strike, and where

t is in seconds, and a is in units of gravity (g).

(6) Where leg injuries may result from contact with seats or other structure, protection must be provided to prevent axially compressive loads exceeding 2,250 pounds in each femur.

(7) The seat must remain attached at all points of attachment, although the structure may have yielded.

(8) Seats must not yield under the tests specified in paragraphs (b)(1) and (b)(2) of this section to the extent they would impede rapid evacuation of the airplane occupants.

4. By amending § 25.785 by revising paragraph (a) to read as follows:

§ 25.785 Seats, berths, safety belts, and harnesses.

(a) Each seat, berth, safety belt, harness, and adjacent part of the airplane at each station designated as occupiable during takeoff and landing must be designed so that a person making proper use of these facilities will not suffer serious injury in an emergency landing as a result of inertia forces specified in §§ 25.561 and 25.562.

* * * * *

Issued in Washington, DC, on May 12, 1988.

T. Allan McArtor,

Administrator.

[FR Doc. 88-11047 Filed 5-13-88; 10:15 am]

BILLING CODE 4910-13-M